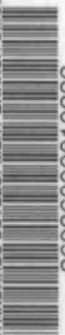


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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF PORT BURWELL

in the

COUNTY OF ELGIN

VILLAGE OF PORT BURWELL 1968

1968

COUNTY OF ELGIN

TD  
380  
.P672  
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1968

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Report of a water pollution  
survey of the village of Port  
Burwell, county of Elgin.

80376

REPORT  
OF A  
WATER POLLUTION SURVEY  
OF THE

VILLAGE OF PORT BURWELL

COUNTY OF ELGIN

1968

DISTRICT ENGINEERS BRANCH  
DIVISION OF SANITARY ENGINEERING

# ONTARIO WATER RESOURCES COMMISSION

## R E P O R T

### INTRODUCTION

A pollution survey of water quality in surface water drains, storm sewers and watercourses in the Village of Port Burwell was conducted in 1967. Mr. N. Loucks, Village Foreman, supplied information pertinent to the survey and assisted in the sampling programme.

Water pollution surveys are conducted on a routine basis by the Ontario Water Resources Commission for the purpose of locating and recording sources of existing and potential pollution to watercourses. Enquiries and investigations are made with respect to drains which discharge to local watercourses and samples are collected to determine the significance of the drain discharges and their effects on the receiving waters. Where pollution sources are noted, recommendations are made concerning their abatement.

### GENERAL

The Village of Port Burwell has an assessed population of 669 (1967 Municipal Directory). It is located in the south-eastern section of Elgin County, on the shore of Lake Erie, at the mouth of Big Otter Creek.

In general, surface waters and other drainage from the village are directed to the Big Otter Creek and to Lake Erie. Drainage is effected by several local storm and surface water drains and these are indicated on the accompanying map.

### WATER SUPPLY

The Village of Port Burwell does not have a communal water works system and water supplies are obtained from individual wells.

Since the village residents have been experiencing difficulties in obtaining a satisfactory supply of water, the municipality has approached the OWRC with a request for a Provincial Water Supply Project. As a result, an engineering firm is now preparing a design report related to the construction of a secondary pipeline from the Lake Erie Water Supply System to a suitable terminal point in Port Burwell.

### WATER POLLUTION CONTROL

#### Sewage Treatment Facilities

The Village of Port Burwell does not have a communal sewage collection and treatment system. Individual septic tank systems are utilized to dispose of sanitary wastes.

Information obtained at the time of the survey, and from officials of the Elgin Health Unit indicated that some septic tank systems were discharging inadequately treated sewage to the adjacent watercourse via private drains and direct connections to municipal storm and surface water drains.

In some parts of Port Burwell, clay soil conditions have impaired the functions of field tile disposal beds. Also in parts of the village, particularly the business area, space is not

available for the installation of adequate field tile disposal beds. Consequently, direct connections from private disposal units to surface water drains have been made. This has resulted in the discharging of inadequately treated sanitary sewage into the local surface water drainage system.

#### Refuse Disposal

The village refuse disposal area is located just east of Port Burwell on Lot 15, Concession 1. The type of operation conducted at this site was reported to be open-faced dumping on the edge of a steep bank which drains to a tributary of Little Otter Creek.

The site was inspected on two occasions, August 24 and October 31, 1967. At the time of both inspections, it was noted that the operation of the site was unsatisfactory as refuse was observed in the creek. Also, because of the proximity of the site to the watercourse and lack of protective embankment, it appears that leachate from the dumping area drains to the adjacent creek.

Since the present mode of operation at the refuse disposal site is creating a pollution hazard to the adjacent stream, it is recommended that the location and mode of operation at the site be modified such that it will no longer prejudice the adjacent watercourse. In the event that this is not feasible, then the municipality should consider a more suitable location for its refuse disposal area.

## WATER QUALITY ANALYSES

As a measure in assessing the level of pollution being discharged from the village, water samples were collected, where possible, from the flows of surface water drains, storm sewers and the receiving watercourse known as Big Otter Creek.

The sanitary chemical analyses and the results of bacteriological examinations of samples collected from the streams and drains are listed in Tables I and II respectively. The locations of sampling points are designated on the accompanying map by watercourse mileage distances from Lake Erie. Drain locations are also indicated on the map.

## INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

### Bacteriological Examination

The membrane filter (MF) technique is employed at OWRC Laboratories to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres (ML) of the sample.

The presence of coliforms may indicate pollution from both faecal and non-faecal sources while E.Coli organisms indicate pollution of intestinal origin only. The maximum limit of 2,400 coliform organisms per 100 millilitres is the objective for bacteriological quality of surface water in Ontario.

### Sanitary Chemical Analyses

#### Biochemical Oxygen Demand (BOD)

The BOD of sewage or polluted waters is the oxygen



required during stabilization of the decomposable organic material by aerobic biochemical action. A five-day BOD determination with incubation at 20 degrees Centigrade is reported. A high BOD is indicative of organic or chemical pollution. A desirable upper limit in surface water is four (4) parts per million (ppm) while the objective maximum in waste discharges to a watercourse is 15 ppm.

#### Solids

The value for total solids expressed in parts per million (ppm) is the sum of the values for the suspended and dissolved matter in water. The concentration of suspended solids which indicates the measure of undissolved solids of organic or inorganic nature is generally the most significant of the solids analyses in regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, deposition in streams, and injury to the habitat of fish. The OWRC's objective for discharge is a suspended solids concentration of not greater than 15 ppm.

#### Alkyl Benzene Sulfonate (ABS) (Anionic Surfactant)

The surfactant is a synthetic organic chemical which is used as a principal ingredient of modern household detergents. The popular use of synthetic detergents for general cleaning purposes has resulted in the incidence of residual ABS in waste discharges.

Therefore, the presence of detergents in water samples is usually an indication of pollution from domestic sources.

#### SIGNIFICANCE OF ANALYSES RESULTS

The appended laboratory results indicate that extremely high levels of pollution were evident in most of the drain outfalls examined. Sanitary chemical analyses revealed excessive BOD, suspended solids and ABS concentrations in the majority of samples tested. Bacteriological examinations disclosed extremely high coliform counts in all samples. These excessively high values are indications of pollution of a domestic nature.

Specific attention is being drawn to the following sample locations:

- (i) Outfall - south of Wellington Street and East of R.R. tracks - Sample (BO-0.38W)
- (ii) - Robinson St. outfall - Sample (BO-0.56W)
- (iii) - Erieus St. outfall - Sample (BO-0.75W)

These samples exhibited BOD values ranging as high as 470 ppm, suspended solids to 6306 ppm, ABS concentrations to 26.3 ppm and coliform counts as great as 97,000,000 per 100 ml of sample.

It should be noted that drain outfall (BO-0.38.W) located south of Wellington Street and just east of the railway tracks was issuing black septic effluent which was ponding and meandering across an adjacent dirt road towards Big Otter Creek. This flow was creating aesthetically displeasing conditions and is a potential hazard to public health as well as a pollution problem.

## SUMMARY AND CONCLUSIONS

This is a report of a water pollution survey of the Village of Port Burwell, the purpose of which was to locate existing and potential sources of water pollution in the community. The survey was conducted in 1967 and the report is based on the results of chemical analyses and bacteriological examinations of water samples collected at that time.

It was indicated that several storm and surface water drains in Port Burwell were grossly polluted and that this pollution was of a domestic nature originating from inadequate septic tank systems in the municipality. Adverse soil conditions, which greatly impair the efficiency of field tile disposal beds, and lot size limitations, have led to the direct discharge of effluent from many of the septic tank systems to the municipal storm and surface water drains. These drains discharge to Big Otter Creek and in turn to Lake Erie.

In addition, there is one drain outfall (located south of Wellington St. and east of R.R. tracks - BO-0.38W) which discharges septic tank effluent directly to a dirt road. This sanitary sewage flows across the road in the general direction of Big Otter Creek and is a potential health hazard as well as a pollution problem.

The polluted effluent outfalling from the drains in the village is a source of contamination of Big Otter Creek and

Lake Erie. With the construction of a water works system, the pollution problem will probably be magnified.

The ultimate solution to the aforementioned conditions would be the construction of an adequate sewage collection and treatment system for Port Burwell. If this is not feasible an alternate solution, would be the application of corrective measures to the malfunctioning septic tank systems on an individual basis.

#### RECOMMENDATIONS

1. A sewerage works programme consisting of the installation of an adequate system for sewage treatment should be instituted for the Village of Port Burwell.

In the event that this solution does not prove to be feasible, the municipality should then take positive measures to ensure that all private drains, which discharge inadequately treated sewage into any storm or surface water drain, be located and severed.

This action will further necessitate that each property owner provide adequate means for the treatment of his own wastes.

2. Modifications should be applied to the mode of operation being presently conducted at the village refuse disposal site or a new site, free from pollution problems, should be located.

bh

Prepared by

A. Burlachenko

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Division of Sanitary Engineering.

TABLE IVILLAGE OF PT. BURWELL - WATER QUALITY SURVEY

<u>Sampling No.</u>	<u>Location of Sampling Point</u>	<u>5-Day BOD (ppm)</u>	<u>SOLIDS (ppm)</u>			<u>Anionic Detergents as ABS(ppm)</u>	<u>Coliform Count per 100 ml Membrane Filter</u>
			<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>		
BO-0.13	Big Otter Creek near mouth	1.4	320	66	254	0.02	130
BO-0.48	Big Otter Creek about 300 ' S.of Bridge St.	2.1	376	126	250	0.06	1,400
BO-1.11	Big Otter Creek-N.of Village	2.3	348	28	320	0.05	410
LO-0.32	Little Otter Creek at New Lake Road	0.9	310	19	291	0.0	760

TABLE II

VILLAGE OF PT. BURWELL - WATER POLLUTION SURVEY

Sampling No.	Location of Sampling Point	5-Day BOD (ppm)	SOLIDS (ppm)			Anionic Detergents as ABS (ppm)	Coliform Count per 100 ml Membrane Filter
			Total	Susp.	Diss.		
Municipal Drain 0.00W	Erieus St.- Lake Erie Outfall	2.8	608	352	256	0.12	13,600
BO-0.23W	Strachan St.Drain outfall	24	986	78	908	11.8	26,000,000
BO-0.38W	Outfall S.of Welling- ton St.-E. of R.R.	140	2850	2170	680	**	16,000,000
BO-0.39D	Drain-Surface water run-off from coal yards	No flow at time of inspection.					
BO-0.56W	Robinson St. outfall	470	2654	2336	318	26.3	70,000,000
BO-0.75W	Erieus St. outfall	370	6306	4872	1434	**	97,000,000

\*\* Sample exhausted, test could not be performed.

## APPENDIX

### IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

### OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

#### 1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

### Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

### Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the



PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

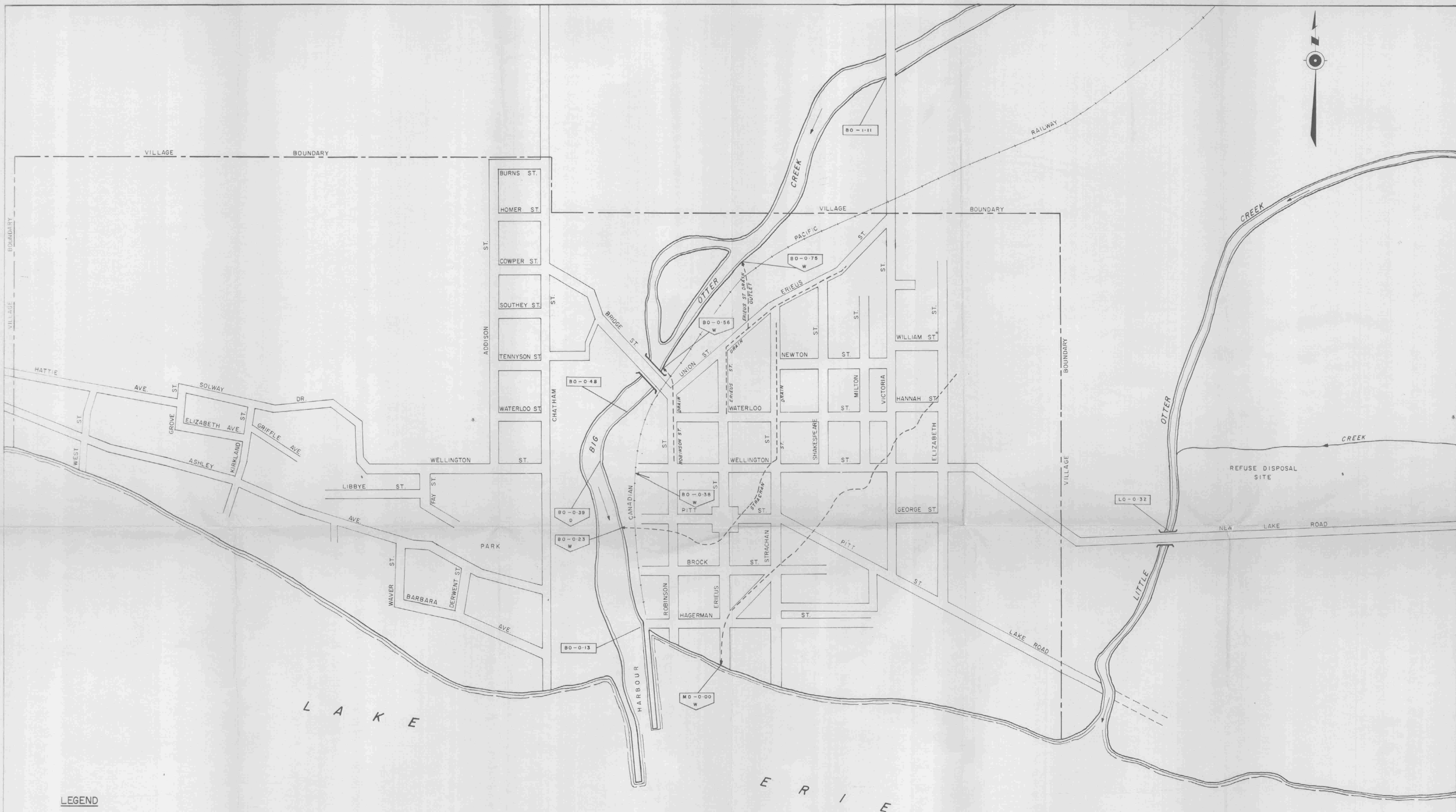
A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



## LEGEND

- BO-0.48 - STREAM SAMPLING POINT SHOWING MILEAGE  
 BO-0.39  
 D - DRAINAGE OR DITCH  
 W - STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

 VILLAGE OF PORT BURWELL  
 WATER POLLUTION SURVEY  
 1967

SCALE: 400 0 400 FEET

DRAWN BY: L. L. BROOME DATE: APRIL, 1968

CHECKED BY: T. B. DRAWING No. 68-38